



## EPA Region 7 TMDL Review

TMDL ID 374 Water Body ID IA-02-IOW-00390-L  
Water Body Name Lake Macbride  
Pollutant Nutrients and Siltation  
Tributary Mill Creek and Jordan Creek  
State IA HUC 0708020810  
Basin Iowa River  
Submittal Date 3/7/2005  
Approved yes

### Submittal Letter

*State submittal letter indicates final TMDL(s) for specific pollutant(s)/ water(s) were adopted by the state, and submitted to EPA for approval under section 303(d) of the Clean Water Act.*

A letter submitting this TMDL for approval was received by EPA on March 7, 2005.

### Water Quality Standards Attainment

*The water body's loading capacity for the applicable pollutant is identified and the rationale for the method used to establish the cause-and-effect relationship between the numeric target and the identified pollutant sources is described. TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.*

Loading capacity for nutrients is calculated as pounds of phosphorus per year to meet a trophic state index (TSI) of < 62. The TSI relates phosphorus to chlorophyll and Secchi depth which are used to describe water quality that will meet Iowa's narrative water quality standards. In this TMDL the limit is set at the present value, 19,520 pounds per year, because the TSIs for chlorophyll and Secchi depth are presently being met. The numeric target for siltation is a sediment load which will not decrease the volume of the lake by more than one third over the design life of 100 years. This is set at 34,500 tons per year. Meeting the targets given in this TMDL should result in the attainment of water quality standards for nutrients and siltation.

### **Numeric Target(s)**

*Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. If the TMDL is based on a target other than a numeric water quality criterion, then a numeric expression, site specific if possible, was developed from a narrative criterion and a description of the process used to derive the target is included in the submittal.*

Lake Macbride is designated for A1 (primary contact) and B(LW) (aquatic life) uses. Nutrients and siltation have impaired aesthetic and narrative water quality criteria and are impairing the A1 (primary contact) and B(LW) (aquatic life) uses. The trophic state index (TSI) is used to relate phosphorus to chlorophyll and Secchi transparency which are used to address the narrative water quality standards. The targeted phosphorus TSI is the existing value of <62 because the targeted TSIs for chlorophyll and Secchi Depth (<60) are being met.

For siltation a lake must lose no more than one third of its volume of the design life of the lake. This TMDL assigns a TMDL for sediment (34,500 tons per year) that will ensure this goal.

### **Link Between Numeric Target(s) and Pollutant(s) of concern**

*An explanation and analytical basis for expressing the TMDL through surrogate measures (e.g., parameters such as percent fines and turbidity for sediment impairments, or chlorophyll-a and phosphorus loadings for excess algae) is provided, if applicable. For each identified pollutant, the submittal describes analytical basis for conclusions, allocations and margin of safety that do not exceed the load capacity.*

A numeric link is established for phosphorus to address the TSI(Ch) and TSI(SD) targets of < 60. As both TSI(SD) and TSI(CH) are presently being met, the current TSI(TP) < 62 is given to protect the lake from exceeding the targets for Secchi depth and chlorophyll. Allocations are based on basin models linking phosphorus loading to concentrations of phosphorus seen in the lake.

The link for siltation is direct, the amount of sediment load to the lake is set such that no more than one third of the lake's original volume will be filled with sediment in the 100 year design life designated for this lake. The determination of present load is taken from the average annual sediment delivery estimated using RUSLE models.

### **Source Analysis**

*Important assumptions made in developing the TMDL, such as assumed distribution of land use in the watershed, population characteristics, wildlife resources, and other relevant information affecting the characterization of the pollutant of concern and its allocation to sources, are described. Point, non point and background sources of pollutants of concern are described, including magnitude and location of the sources. Submittal demonstrates all significant sources have been considered.*

The source assessment includes point sources from the City of Solon and the Macbride Sanitary Sewer District, nonpoint sources, internal cycling from sediments and atmospheric deposition. From loading function modeling most of the nonpoint phosphorus comes from row crop land use with smaller amounts coming from point sources. Additional sources include septic systems, manure and waste from pets and wildlife. These additional sources will be evaluated and quantified as required in phase 2 of this TMDL.

Sediment sources are upland sheet and rill erosion and gully, streambed and bank erosion. The submittal appears to have considered all significant sources of the targeted pollutants.

#### **Allocation**

*Submittal identifies appropriate wasteload allocations for point, and load allocations for nonpoint sources. If no point sources are present the wasteload allocation is zero. If no nonpoint sources are present, the load allocation is zero.*

Phase 1 of this TMDL sets loads equivalent to TSI(TP) at  $\leq 62$  to continue to maintain or reduce TSI(SD)&(CH)  $\leq 60$ . Sediment loading is set to ensure that no more than one third of the original lake volume will be sedimented in during the remainder of the 100 year design life of the lake.

#### **WLA Comment**

The WLA for phosphorus is set at 2,750 pounds per year divided between Solon WWTF (1,920 pounds) and Macbride SSD WWTF (830 pounds). For sediment there are no point sources identified and the WLA is set to zero.

#### **LA Comment**

The phosphorus load allocation is set at 16,770 pounds per year.

The sediment load allocation is set at 31,100 tons per year.

#### **Margin of Safety**

*Submittal describes explicit and/or implicit margin of safety for each pollutant. If the MOS is implicit, the conservative assumptions in the analysis for the MOS are described. If the MOS is explicit, the loadings set aside for the MOS are identified and a rationale for selecting the value for the MOS is provided.*

The phosphorus MOS is implicit. The lake is already meeting its target load. Additionally, the present lake response load used to set the TMDL is 38% less than the Loading Function Model's estimate based on present land use in the watershed.

The MOS for siltation is explicit. The MOS is set at 3,400 tons per year or 10 % of the TMDL.

#### **Seasonal Variation and Critical Conditions**

*Submittal describes the method for accounting for seasonal variation and critical conditions in the TMDL(s).*

The TMDL was developed using annual phosphorus loading that would result in growing season targets for TSI(SD)&(CH).

Annual loading was also targeted for sediment though the specific loads are the result of periodic precipitation events.

### **Public Participation**

*Submittal describes public notice and public comment opportunity, and explains how the public comments were considered in the final TMDL(s).*

A public meeting was held on July 13, 2004 in Solon with the Lake Macbride Watershed Advisory Committee. An additional public meeting was scheduled in Solon for January 20, 2005 to present the draft TMDL for public comment. The TMDL was also posted on the IDNR website. Comments received were reviewed and, where appropriate incorporated into the TMDL.

### **Monitoring Plan for TMDL(s) Under Phased Approach**

*The TMDL identifies the monitoring plan that describes the additional data to be collected to determine if the load reductions required by the TMDL lead to attainment of WQS, and a schedule for considering revisions to the TMDL(s) (where phased approach is used).*

Follow-up monitoring will continue to meet, at a minimum, the minimum data requirements established by Iowa's 305(b) guidelines. An assessment will be completed by 2010 containing 3 lake samples per year for three years or 10 lake samples over a two year period. When a protocol for quantifying internal phosphorus cycling is complete this component will be measured in Lake Macbride. IDNR will also include phosphorus monitoring requirements for NPDES permits and after a one year monitoring period the permits will be amended to include effluent limits for phosphorus.

### **Reasonable assurance**

*Reasonable assurance only applies when reduction in nonpoint source loading is required to meet the prescribed waste load allocations.*

Though there are point sources of phosphorus in this lake there is no requirement for reduced nonpoint source loading to meet the WLA, therefore, reasonable assurances do not apply for this TMDL.